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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/766,477	01/19/2001	Klan Teng Eng	TI-22944.2	2137

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Mark E. Courtney
Texas Instruments Incorporated
P.O. Box 655474, MS 3999
Dallas, TX 75265

EXAMINER

MITCHELL, JAMES M

ART UNIT PAPER NUMBER

2827

DATE MAILED: 01/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/766,477	Applicant(s) ENG ET AL.	
	Examiner James M. Mitchell	Art Unit 2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 21-23 and 25-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Holman (US 6,005,776).

Holman (Fig 2, 3, 5) discloses an inherent process of providing a high density module (200m) produced by a process comprising the steps of inherently providing a circuit board (210) having a substantially top planar surface (via in a plane) for connection to at least one integrated circuit package (Abstract; "CSP; items 520, 540, 530) and electrically connecting at least one integrated circuit package (via assembly provides package for IC; Abstract) having a pair of opposing major surfaces (largest two surfaces; vertical surfaces of package) and at least one edge surface (via horizontal portion; smaller surface) is a four edge surfaces (via balls along edge surface matched with land; Fig 3) disposed between said opposing major surfaces, one of said at least one edge surface having at least one electrical terminal (Fig. 5; via 550 along edge surface; Col. 4, Lines 49-61) and electrically connecting said at least one electrical

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terminal on said at least one side of the package (Col. 4, Lines 42-43) and to said top surface of said board; an inherent step of electrically and perpendicularly connecting at least two IC packages to said circuit board at an edge (Fig 2) in a substantially perpendicular ("perpendicular"; Abstract) manner at an angle inherently between 30 and 90 degrees to said circuit board; further including the steps of inherently disposing a solder ball (240; Col. 3, Lines 54-55) between side surface terminals of said IC package and said board (Col. 3, Lines 43-44 & 54-55) that are integrally attached to said board (Col. 3, Lines 44-45); wherein at least three pads (Fig 3; 320) that are short projections and therefore are tabs inherently provide a step of integrally attaching to said board (via tabs formed on board).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Holman (US 6,005,776) in combination with Dockerty (US 6,395,991).

Holman does not appear to disclose the use of solder columns.

However, since applicant did not timely traverse examiner's official notice, the use of solder columns is deemed accepted and traversal waived. Dockerty is provided only to further evidence the use of solder column in chip packaging.

As such, it would have been obvious to one of ordinary skill in the art to incorporate solder column for solder balls in order to increase fatigue life (Col. 1, Lines 40-47).

Response to Arguments

Applicant's arguments filed September 22, 2003 have been fully considered but they are not persuasive.

Applicant contends that no where does Holman teach an integrated circuit package having an electrical terminal on an edge surface as opposed to one of the major surfaces. Examiner respectfully disagrees. Holman expressly discloses an IC die in a package (Holman abstract); thus an IC package is formed. As for the terminal being on an edge, Fig. 5 shows as disclosed in column 4 of Holman's specification that the terminal ("interconnect"; forms connection and therefore is a terminal) curves around material, 530, resulting in the terminal being on an edge surface.

Applicant contends that Holman does not teach a step of electrically and perpendicularly connecting the one terminal on the edge surface to the top surface of the printed circuit board. Examiner disagrees. Inherent in a product that has a vertical package (perpendicular to horizon) and a solder ball electrically connected between the terminal connection and the top surface of the printed circuit board (to send signals) is a step of electrically connecting.

Applicant contends that Holman does not teach the package connected at an angle between 30 and 90 degrees. Examiner respectfully disagrees. The claim read broadly is satisfied by a package being at any angle between 30-90 (i.e.

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30,31,32,33,34...89,90). A vertical package set at 90 degrees is within the scope of the claim.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

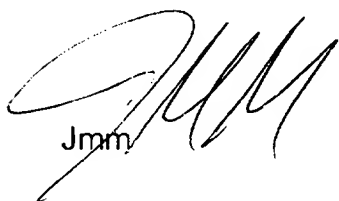
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 6:30-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571) 272-1957. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

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Jmm



DAVID E. GRAYBILL
PRIMARY EXAMINER